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Spatial data infrastructure and development: the World Bank approach

Submitted by the World Bank**

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Spatial data infrastructure and development

The World Bank Approach

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The World Bank

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1. What does SDI mean for the World Bank ?

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- **SDI** describes the fundamental spatial datasets, the standards that enable them to be integrated, the distribution network to provide access to them, the policies and administrative principles that ensure compatibility between jurisdictions and agencies, and the people including user, provider and value adder who are interested at a certain level of area that starts at a local level and proceeds through state, national and regional levels to global level (by ANZLIC the Australian and New Zealand Land Information council).

Typical data in an SDI

- Geodetic framework
- Topography
- Hydrology
- Administrative Boundaries
- Geographic names
- Cadastre, Land tenure, value and land use

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Public and private data providers

- Public agencies, including mapping agencies, national cadastre, property registry, statistical agency
- Local governments, such as provinces and municipalities
- Private stakeholders, such as utility, facility and telecommunications companies, private surveyors

Public and private data users

- Data providers
- Public decision makers, such as ministries and public agencies that bases their decisions on spatial information
- Private users: transport, logistics companies, banks, citizens
- Values adders, such as geo-marketing firms, GIS providers, etc.

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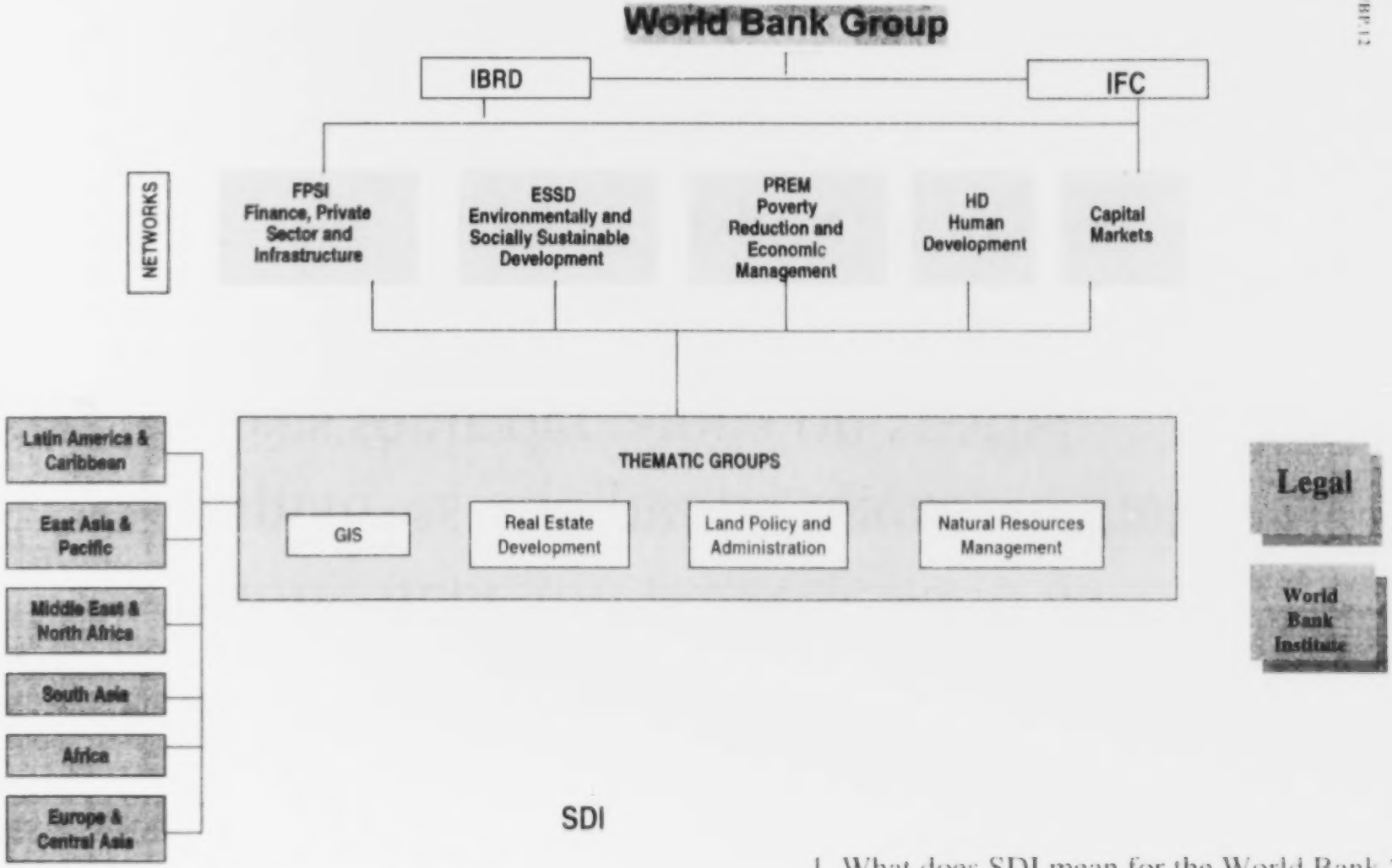
Knowledge structure across the World Bank



SDI

1. What does SDI mean for the World Bank ?

World Bank thematic groups sharing knowledge on SDI

- **The GIS TG** (www.worldbank.org/gis)
- **The Land Policy and Administration TG** (www.worldbank.org/landpolicy)
- **The land and Real Estate Initiative TG** (http://www.worldbank.org/html/fpd/urban//re_dev/red_body.htm)
- **The Natural Resources management TG** (http://www.worldbank.org/environment/topics.htm)

2. Why are SDIs important for the WB?

- Key for objective decision making and sound land based policy
- Support economic development
- Encourages socially and environmentally sustainable development
- Increasingly key components of many World Bank projects

Key for objective decision making and sound and land based policy

- knowledge of the location of an activity allows it to be linked to other activities or features that occur in the same nearby location
- location allows distances to be calculated, maps to be drawn, directions to be given and decisions to be taken about complex and inter related issues (Williamson, ''RSDI, An initiative to facilitate regional security)

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Support economic development:

- SDIs supports natural disaster management system and are consequently key to anticipate and reduce the economic burden of these disasters
- Well maintained parcel based property registry enables (1) national land market to be developped, (2) credit system to be fostered and (3) private investments on land to be secured

Land and real estate projects support economic development

- 7-20% of GDP is real estate investment
- 15-40% of household expenditure is on real estate
- 50-75% of national wealth is in real estate
- Leading indicator of GDP (residential development in the U.S...)
- 20-70% of credit is secured by real estate
- 85% of housing investment is financed through credit in OECD countries
- More than 90% of the assets of the poor are in land and real estate

Encourage environmentally and socially sustainable development

- SDIs facilitate comprehensive approaches of the territory, including rural/urban and public/private lands, natural resources, indigenous lands
- SDIs enable the implementation of integrated national and regional policies across sectors
- SDIs encourage basic social principles such as equity, security, transparency and efficiency

Increasingly key component in WB projects

- World Bank has approved 173 land related project from 1989 to 1999, including property rights/ land information systems, real estate development and mortgage finance, market regulation and fiscal Policy
- SDI components (geodesy, cadastre and land tenure information) counts generally for more than 50% of land administration projects total budget

Source: 1999 World Bank land and real estate assessment

3. SDIs key success factors

- Clarified legal framework
- Sustainable institutional arrangements and strategic partnerships
- New technologies to solve old problems

Clarified legal framework

- Providing a clear distribution of responsibilities among public and private stakeholders for the production and maintenance of spatial data
- Clarifying rights related to the access to public digital data
- Setting up legal provisions for data confidentiality and access to private data

Sustainable institutional arrangements and strategic partnerships

- Decentralization of services to better fit the final users needs

- Public and private partnerships are key:
  - in data production, maintenance, access and marketing;
  - to have access to cutting-edge technology

Sustainable institutional arrangements and strategic partnerships

- Designing SDI according to the business process it relates = mapping the process before mapping the earth
- Determine licensing and royalties policies serving long term objectives and not focus on short term commercial benefits
- Time is needed and project experience feedback required to adapt the legal and institutional framework

New Technology to solve old problems

- Quality approach = demand driven and not supply driven
- Capacity building with emphasis on human resources
- Sound use of information and communication technology
- Prioritize data layers and IT investments given the scarcity of financial resources

New Technology to solve old problems

- For data acquisition =
  - easy to use modern technology
  - satellite imagery and positioning systems
- For data management and maintenance =
  - Large choice of GIS and Date Base software
  - Access to local technical assistance/maintenance
- For data sharing, access and marketing=
  - outsourcing to private sector
  - e-services

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4. World Bank approach in Central America

- Countries: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama
- More than 30 million people
- 500,000 sq.km
- Land administration programs and the Meso American Biological Corridor (MBC)

CA land administration programs

- Land administration portfolio
  - current = US$250 million
  - upcoming > US$500 million
- SDI component share
  - counts for about 50% to 60% of the project total costs
  - geodetic, large scale topographic and cadastral data
  - implementation of land information systems

CA workshops on land administration

- 6 workshops on land were organized for CA countries in collaboration with USAID and the WB:
  - 1996 workshop in Costa Rica
  - 1998 and 2000 workshop in El Salvador
  - 1999 workshop in Guatemala
  - 1998 and 2000 workshop in Washington DC

CA workshops on land administration

- Participants discussed common issues related to land including SDI issues such as:
  - legal and institutional issues related to SDI components
  - technical standards and norms for SDI components, including geodesy, base mapping and cadastral surveys
  - capacity building and training for spatial data experts
  - guidelines to procure SDI components

The MBC

- MBC portfolio, including medium and small scale environmental data:
  - current = US$ 100million
  - upcoming = US$ 100million
- SDI component
  - count for about 50% to 60% of the project total costs;
  - includes medium and small scale environmental data from satellite imagery

Two regional spatial infrastructure

- USAID supported geodetic network;
  - implemented by national mapping agency to fit with national programs
  - collaboration with national WB project to guaranty technical consistency.
- CA vegetation maps:
  - CA, including Belize
  - 1/25,000 scale maps from Landsat satellite imagery
  - 60 land use classes

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5. The specific case of El Salvador Land Administration project

- El Salvador = 20,000 sq.km, 6 million inhabitants
- Project amount = US$ 70 million
- IBRD loan = US$50 million
- Time frame: 1997 - 2002

Project objectives

- Registering all properties, urban and rural, private and public

- Strengthening the land registry, national cadastre and mapping agency to keep information updated and self finance the maintenance

Project components

- Institutional strengthening = US$6.1M
- Institutional decentralization = US$4.5M
- Mapping of land data acquisition = US$15.1M
- Land record regularization = US$35.4M
- Project administration = US$8.7M

What is key in terms of SDI

- A unique institutional structure, the CNR (Centro Nacional de Registros) comprised by:

  – property registry
  – directorate of cadastre
  – mapping agency
  – intellectual property registry
  – commercial registry

What is key in terms of SDI

A technically strengthened institution

- Modern digital mapping & surveying equipment
- SIRyC = fully computerized cadastral and registral information system
- SIG = national geodetic and topographic computerized data base
- SIIGE = management information system

What is key in terms of SDI

- Complete large scale coverage of the entire territory
  - new national geodetic network, including two CORS provided by USAID;
  - 1:1,000 scale urban maps and 1:5,000 orthophotmaps for the entire country in a digital format;
  - 1 meter accuracy rural and 50cm urban cadastral surveys for the entire country

What is key in terms of SDI

- Partnership with municipalities for data maintenance
  - CNR provides to municipalities the first topographic and cadastral information
  - Municipalities provide the CNR with cadastral updates.

6. Next steps

- Carry out economic study to evaluate the economic value and utility of SDIs and showing SDI as key infrastructure for economic development
- Include SDI in the bank strategic documents = CAS and ESW
- Disseminate more intensively SDI benefits throughout the WB knowledge network

Next step

- Improve and harmonize SDI TORs and Tech. Specs in WB projects

- Develop partnership between WB and other SDI stakeholders, including the UN, the PC on SDI for the America